

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application.

COMPLETE LISTING OF THE CLAIMS:

Claims 1-136 : (Canceled)

Claim 137 : (New) A data communications system, comprising:

a plurality of nodes and a plurality of links for providing connections between the plurality of nodes;

a subset of the plurality of links and the plurality of nodes being operative for forming a worker path carrying worker data through the communications system;

a further subset of the plurality of links and the plurality of nodes being operative for forming a protection path for carrying non-worker data in the absence of a fault in the worker path, the protection path comprising a plurality of disjoint detours, each detour being operative for providing an alternative path for the worker data in a different part of the worker path in the event of a fault in the worker path; and

protection means, in which the protection path is predetermined by the protection means prior to detection of a fault in the worker path, the protection means being operative for activating the entire plurality of detours to carry the worker data upon detection of a fault in the worker path, and the protection means being further operative for identifying the location of the fault, and for returning the worker data to a part of the worker path not affected by the fault from at least one of the plurality of detours providing an alternative to that part of the worker path

not affected by the fault, while those of the plurality of detours providing an alternative to parts of the worker path which are affected by the fault continue to carry the worker data.

Claim 138 : (New) The system according to claim 137, in which the plurality of nodes of the further subset comprise storage for storing details of the plurality of detours prior to the detection of the fault in the worker path.

Claim 139 : (New) The system according to claim 138, in which the details of the protection path are associated with a unique path identifier.

Claim 140 : (New) The system according to claim 138, in which each of the plurality of nodes of the further subset comprise a protection table for storing the details of the protection path to which it belongs.

Claim 141 : (New) The system according to claim 137, in which at least one of the plurality of nodes common to both subsets comprises means for detecting the fault in the worker path, and means for activating the plurality of detours by sending an activate message to the plurality of nodes of the further subset upon detection of the fault in the worker path.

Claim 142 : (New) The system according to claim 141, in which the plurality of nodes comprising means for sending the activate message also comprise means for sending the activate message to each adjacent node of the further subset.

Claim 143 : (New) The system according to claim 141, in which the activate message contains a unique path identifier to inform the plurality of nodes of the further subset which connections to activate.

Claim 144 : (New) The system according to claim 137, in which the plurality of nodes comprise means for detecting the location of the fault in the worker path and

means for, upon detection of the fault location, sending a deactivate message through the first-mentioned subset in a direction away from the fault.

Claim 145 : (New) The system according to claim 144, in which each node comprises means for detecting receipt of the deactivate message and, upon receipt of such a message, for deactivating any path passing from that node via the plurality of nodes of the further subset where those paths do not form a protection path to a faulty part of the worker path.

Claim 146 : (New) The system according to claim 137, comprising means for allocating the plurality of links and the plurality of nodes at least one cost value relative to the plurality of links and the plurality of nodes of the worker path, and means for selecting on the basis of the at least one cost value the further subset of the plurality of nodes and the plurality of links to form a protection path for at least one of the plurality of links and the plurality of nodes of the worker path.

Claim 147 : (New) The system according to claim 146, comprising means for selecting the subset that has the lowest cost value.

Claim 148 : (New) The system according to claim 147, comprising means for allocating the plurality of nodes and the plurality of links on the worker path other than the at least one of the plurality of nodes and the plurality of links to be protected a cost value lower than the cost value for the other of the plurality of nodes and the plurality of links.

Claim 149 : (New) The system according to claim 148, in which the lower cost value is zero.

Claim 150 : (New) The system according to claim 146, comprising means for allocating the at least one of the plurality of nodes and the plurality of links to be protected a cost value higher than the cost value for the other of the plurality of nodes and the plurality of links.

Claim 151 : (New) The system according to claim 146, in which a cost value for the at least one of the plurality of nodes and the plurality of links to be protected is set so that the at least one of the plurality of nodes and the plurality of links will not be selected.

Claim 152 : (New) The system according to claim 146, comprising further subsets of the plurality of nodes and the plurality of links for forming both a further worker path and a protection path for the further worker path.

Claim 153 : (New) The system according to claim 152, comprising means for allocating to at least one of a node and a link at least one intermediate cost value relative to each link and node of the worker path, provided that the at least one of the plurality of links and the plurality of nodes in the worker path and the plurality of links and the plurality of nodes in the further worker path protected by the at least one of the plurality of nodes and the plurality of links have no common point of failure.

Claim 154 : (New) The system according to claim 153, in which the intermediate value lies between the higher and lower values.

Claim 155 : (New) The system according to claim 154, comprising means for allocating to at least one of a node and a link at least one higher cost value relative to the at least one of the plurality of links and the plurality of nodes of the worker path so that the at least one of the plurality of nodes and the plurality of links will not be selected, and wherein the plurality

of links and the plurality of nodes in the worker path and the plurality of links or the plurality of nodes in the further worker path protected by the node or link have a common point of failure.

Claim 156 : (New) The system according to claim 146, including means for allocating the plurality of links and the plurality of nodes a cost value relative to each link and node of the worker path.

Claim 157 : (New) The system according to claim 146, in which the system comprises protection means for determining the protection path prior to the detection of the fault in the worker path.

Claim 158 : (New) The system according to claim 151, comprising means for allocating the plurality of links and the plurality of nodes a further cost value relative to a further worker path and for selecting on the basis of the further cost value the further subset of the plurality of nodes and plurality of links to form the protection path for at least one of the plurality of links and the plurality of nodes of the further worker path.

Claim 159 : (New) The system according to claim 137, in which a node or a link is allocated to several protection paths only if said protection paths are not activated simultaneously by a single fault.

Claim 160 : (New) The system according to claim 137, in which only a node terminating a detour is adapted to inactivate the detour if said detour is unused.

Claim 161 : (New) A method of protecting a worker path in a data communications system, comprising the steps of:

providing a plurality of nodes and a plurality of links for providing connections between the plurality of nodes;

passing worker data through a subset of the plurality of links and the plurality of nodes making up the worker path, and designating a further subset of the plurality of links and the plurality of nodes to form a protection path;

the protection path carrying non-worker data in the absence of a fault in the worker path, the protection path comprising a plurality of disjoint detours, each detour providing an alternative path for the worker data in a different part of the worker path in the event of a fault in the worker path;

detecting the fault in the worker path, and activating the entire plurality of detours to carry the worker data upon detection of a fault in the worker path; and

identifying a location of the fault, and returning the worker data to a part of the worker path not affected by the fault from at least one of the plurality of detours that are providing an alternative to that part of the worker path not affected by the fault, while those of the plurality of detours providing an alternative to parts of the worker path which are affected by the fault continue to carry the worker data.

Claim 162 : (New) The method according to claim 161, including the step of storing details of the plurality of detours in the plurality of nodes of the further subset prior to the detection of the fault in the worker path.

Claim 163 : (New) The method according to claim 162, including the step of associating the details of the protection path with a unique path identifier.

Claim 164 : (New) The method according to claim 162, in which each of the plurality of nodes of the further subset comprise a protection table for storing details of the protection path of which it forms a part.

Claim 165 : (New) The method according to claim 161, including the steps of at least one of the plurality of nodes common to both subsets detecting the fault in the worker path, and activating the plurality of detours by sending an activate message to the plurality of nodes of the further subset upon detection of the fault in the worker path.

Claim 166 : (New) The method according to claim 165, including the step of operating the plurality of nodes to send the activate message to each adjacent node of the further subset.

Claim 167 : (New) The method according to claim 165, including the step of including a unique path identifier in the activate message to inform the plurality of nodes of the further subset which connections to activate.

Claim 168 : (New) The method according to claim 161, including the steps of at least one node detecting a location of the fault in the worker path and, upon detection of the fault location, sending a deactivate message through the first-mentioned subset in a direction away from the fault.

Claim 169 : (New) The method according to claim 168, including the steps of the plurality of nodes detecting receipt of the deactivate message and, upon receipt of the deactivate message, deactivating any path passing from the node via the plurality of nodes of the further subset where those paths do not form a protection path to a faulty part of the worker path.

Claim 170 : (New) The method according to claim 161, including the steps of allocating the plurality of links and the plurality of nodes at least one cost value relative to the plurality of links and the plurality of nodes of the worker path, and selecting on the basis of the at least one cost value the further subset of the plurality of nodes and the plurality of links to form

a protection path for at least one of the plurality of links and the plurality of nodes of the worker path.

Claim 171 : (New) The method according to claim 170, including the steps of selecting the subset that has the lowest cost value.

Claim 172 : (New) The method according to claim 170, including the steps of setting the at least one cost value for the plurality of nodes and the plurality of links on the worker path other than the at least one of the plurality of nodes and the plurality of links to be protected lower than the cost value for the other of the plurality of nodes and the plurality of links.

Claim 173 : (New) The method according to claim 172, in which the lower cost value is zero.

Claim 174 : (New) The method according to claim 170, including the steps of setting the at least one cost value for the at least one of the plurality of nodes and the plurality of links to be protected higher than the cost values for the other of the plurality of nodes and the plurality of links.

Claim 175 : (New) The method according to claim 170, including the steps of setting the at least one cost value for the at least one of the plurality of nodes and the plurality of links to be protected so that the at least one of the plurality of nodes and the plurality of links will not be selected.

Claim 176 : (New) The method according to claim 170, and comprising a further worker path for protection for the further worker path in the data communications system.

Claim 177 : (New) The method according to claim 176, including the steps of setting the at least one cost value relative to the worker path of one of a node and a link to an intermediate value, provided that the plurality of nodes and/or the plurality of links on the worker path and on the further worker path for protection by the one of the node and the link have no common point of failure.

Claim 178 : (New) The method according to claim 177, in which the intermediate value lies between the higher and lower values.

Claim 179 : (New) The method according to claim 178, including the steps of setting the at least one cost value relative to the worker path of one of a node and a link to a higher value so that the one of the node and the link will not be selected, if the plurality of nodes and/or the plurality of links on the worker path and on the further worker path for protection by the one of the node and the link have at least one common point of failure.

Claim 180 : (New) The method according to claim 170, including the step of allocating each link and node at least one cost value relative to each link and node of the worker path.

Claim 181 : (New) The method according to claim 180, including the step of determining the protection path prior to the detection of the fault in the worker path.

Claim 182 : (New) The method according to claim 181, including the steps of allocating the plurality of links and the plurality of nodes a further cost value relative to the further worker path, and selecting on the basis of the further cost value a further subset of the plurality of nodes and the plurality of links to form the protection path for at least one of the plurality of links and the plurality of nodes of the further worker path.

Claim 183 : (New) The method according to claim 161, including the step of allocating a node or a link to several protection paths only if said protection paths are not activated simultaneously by a single fault.

Claim 184 : (New) The method according to claim 161, including the step of inactivating an unused detour only by a node that terminates said detour.